
Profile of HIV Seropositive Inmates Diagnosed in Maryland's State Correctional System

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Synopsis

Correctional systems increasingly serve as the health care nexus for the initial diagnosis and treatment of human immunodeficiency virus (HIV) infection, particularly among traditionally underserved populations. A survey was conducted to describe the clinical profile of inmates in a State

correctional system diagnosed with HIV infection by various testing strategies.

Approximately 50 percent of the inmates diagnosed were potential candidates for anti-retroviral therapy, and 17 percent were severely immunocompromised. Implementation of voluntary HIV testing at prison entry increased the number of persons identified with HIV infection; however, since volunteers at entry had higher CD4 cell counts compared with infected inmates diagnosed by other methods, there was not a parallel increase in the percentage requiring immediate medical treatment.

These data are important for planning medical resources in the correctional setting and underscore the opportunity to provide prevention and therapy for a vulnerable population with HIV infection. Public health interventions within the correctional setting have a broader societal impact, since most infected inmates serve short sentences (median, 3 years). Clinical case management is critical for inmates with HIV infection released to the community so that linkages with primary care providers and support services can be established.

SEROEPIDEMIOLOGIC surveys indicate that the prevalence of human immunodeficiency virus (HIV) infection among inmates entering correctional facilities is higher than in the general population (1). A 1992-93 survey by the National Institute of Justice described an aggregate incidence rate of acquired immunodeficiency syndrome (AIDS) of 363 cases per 100,000 for State and Federal correctional systems compared with a rate of 18 cases per 100,000 in the U.S. population. Moreover, among inmates with AIDS in this survey, 2,858 died while incarcerated, representing 2 percent of all AIDS deaths among American adults and adolescents (2).

Since prison entrants are generally medically underserved, incarceration provides a strategic opportunity for medical and public health interventions (3). The clinical staging of inmates with HIV infection, however, has not been widely reported. Yet these

data provide an essential reference for correctional systems in allocating resources and planning health care delivery to inmates with HIV infection. The purpose of this survey was to characterize the HIV seropositive population in a State correctional system that diagnosed HIV infection through voluntary testing at prison entry and through clinically based evaluations during incarceration.

Methods

The survey was conducted in the Maryland Division of Correction (DOC), a State prison system encompassing 23 institutions with a 1992 census of approximately 19,000 inmates. The study population included those HIV seropositive inmates incarcerated as of December 1992. In January 1991, the Maryland DOC implemented a voluntary HIV testing program

offered to all prison entrants that included group education and individual pre- and post-test counseling by DOC social workers. Additionally, HIV testing and counseling were offered to asymptomatic and symptomatic inmates after prison entry who presented to clinicians with a history or physical examination indicative of potential HIV infection. Prior to 1991, HIV testing was generally offered only to clinically ill inmates with symptoms of AIDS.

Inmates diagnosed with HIV infection were evaluated, monitored, and treated by a clinician in accordance with standardized DOC protocols, including the initial and periodic assessment of CD4 cell counts. Anti-retroviral therapy was offered to all infected inmates with CD4 counts of 500 cells per cubic millimeter (mm^3) or less; while *Pneumocystis carinii* pneumonia prophylaxis was offered to all inmates with CD4 counts of 200 cells per mm^3 or less or a prior episode of *Pneumocystis carinii* (4,5).

Through January 1993, all infected inmates were staged by a physician in accordance with the 1987 Centers for Disease Control (CDC) criteria (6). CD4 cell counts were abstracted from inmate medical records by nursing staff and maintained in confidential computer files. HIV testing and T-cell subset analyses were performed by the laboratories of the Maryland Department of Health and Mental Hygiene using CDC's testing guidelines. Reactive HIV-1 enzyme-linked immunosorbent assays (ELISAs) (A), were confirmed by Western blot (B).

T-cell subsets were measured by CDC and flow cytometric procedures. Frequency distributions of clinical staging characteristics were generated for HIV seropositives by method of ascertainment (that is, voluntary testing or clinically based testing) with chi-square, *t*-test, and nonparametric median tests used to facilitate interpretation.

Results

We identified 666 inmates diagnosed with HIV infection and incarcerated as of December 1992. For this survey, data from 661 inmates were analyzed since CD4 cell counts were not obtained from 5 inmates prior to subsequent release. CDC's classification data were available for only 624 of the 661 inmates, since 37 inmates were awaiting physical examinations and classification at the time of data analysis or were released prior to evaluation.

Of the 661 inmates, 309 (46.8 percent) were diagnosed during 1991 and 1992 by voluntary testing at prison entry (Group 1), 244 (36.9 percent) were diagnosed during 1991 and 1992 as a result of clinical evaluations (Group 2), and 108 (16.3 percent)

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were inmates from the standing population who were diagnosed between 1985 and 1990 after presenting clinically with symptoms of AIDS (Group 3).

The study population of 661 inmates was 91.7 percent male and 91.4 percent African American, with a mean age of 34.2 years. Female inmates with HIV infection were more likely to be diagnosed by voluntary testing at prison entry than male inmates. Inmates' sentence length was significantly related to method of HIV testing. Prison entrants diagnosed by voluntary testing had median sentences of 48 months compared with those inmates diagnosed by clinical evaluations (96 months) and as part of the standing population (147 months).

Sentence length also correlated with stage of disease. Inmates with CD4 counts of less than 500 cells per mm^3 had significantly longer sentences than inmates with CD4 counts greater than 500 cells per mm^3 , 84 months versus 60 months (data not shown).

Clinical staging of the study population was assessed by CD4 cell counts and CDC's classification comparing the three groups of HIV seropositive inmates by method of ascertainment (see table). Inmates diagnosed at prison entry during 1991 and 1992 (Group 1) had significantly higher CD4 cell counts than those inmates diagnosed after prison entry (Groups 2 and 3). Among inmates identified at prison entry, 40.8 percent were potential candidates for anti-retroviral therapy, but only 8.1 percent were severely immunocompromised (CD4 counts less than 200 cells per mm^3). In contrast among Group 2 inmates, who had initially refused HIV testing at prison entry but were later diagnosed as HIV seropositive, 55.3 percent were candidates for anti-retroviral therapy (that is, CD4 count less than 500 cells per mm^3), and 22.1 percent were candidates for *Pneumocystis carinii* pneumonia prophylaxis (that is, CD4 counts less than 200 cells per mm^3).

Inmates identified by AIDS symptoms prior to 1991 (Group 3) were the most severely immunocompromised. Compared with inmates from Groups 1 and 2, Group 3 inmates had significantly lower CD4 cell counts and were more often classified with CDC stage IV disease.

Maryland Division of Correction HIV seropositive population, percentages

Demographic characteristics and diagnosis	Total (N=661)	Group 1 entry volunteers (N=309)	Group 2 clinical evaluations (N=244)	Group 3 standing population (N=108)	P values		
					1 vs 2	1 vs 3	2 vs 3
Male	91.7	86.1	97.1	95.4	<.001	<.01	...
Female	8.3	13.9	2.9	4.6			
Black	91.4	91.9	92.2	88.0			
White	8.6	8.1	7.8	12.0			
Age, years (mean).....	34.2	33.5	34.8	34.7	<.02
Sentence, months (median) ..	72	48	96	147	<.001	<.001	<.02
CD4 count (cells per mm ³):					<.001	<.001	<.02
<200	16.6	8.1	22.1	28.7			
200-500	34.5	32.7	33.2	42.6			
500	48.9	59.2	44.7	28.7			
Median.....	500	550	460	380			
CDC classification: ¹					NS	<.001	<.02
I.....	0.5	0.7	0.4	0.0			
II.....	59.4	63.3	60.9	45.4			
III.....	28.2	28.7	26.5	31.5			
IV.....	11.9	7.3	12.2	23.1			

¹ Percentages based on a total of 624 inmates, since 37 were awaiting CDC classification at the time of data analysis; for Group 1 = 286, Group 2 = 230, Group 3 = 108.

NOTE: NS = not significant.

Discussion

The American College of Physicians, National Commission on Correctional Health Care, American Correctional Health Services Association, American Public Health Association, and World Health Organization have highlighted the public health impact of the HIV epidemic on correctional health care services. They have called for increased voluntary HIV testing and counseling, innovative prevention strategies, and bolstering of medical resources within prisons (7,8). Implementing these recommendations is especially critical, since prison entrants are traditionally medically underserved, yet they have significant health care problems. As local, State, and Federal correctional systems expand HIV voluntary testing programs, assessing the medical needs of HIV-infected incarcerated populations will be essential for targeting prevention and treatment strategies.

In the Maryland correctional system, the clinical status of infected inmates was comparable to HIV-infected persons diagnosed at Baltimore sexually transmitted disease (STD) clinics (9). Although the guidelines for initiating anti-retroviral therapy continue to evolve based on the results of recent European and Australian clinical trials (10,11), approximately 50 percent of the 661 Maryland inmates diagnosed with HIV infection were potential candidates for anti-retroviral treatment (CD4 counts less than 500 cells per mm³). Slightly more than 16 percent of infected inmates were severely immunocompromised, at risk for AIDS-related complica-

tions, and were candidates for *Pneumocystis carinii* prophylaxis. (The number of Maryland inmates diagnosed with AIDS would be predicted to increase by approximately 81 percent with application of the 1992 revised CDC's classification system [12].)

Based on quality assurance audits, the majority of Maryland inmates (85 percent) who were candidates for anti-retroviral therapy and *Pneumocystis carinii* prophylaxis actually received medically indicated treatments; the remainder either refused treatment or were still being evaluated at the time of the survey (data not shown).

Providing medically indicated treatments to Maryland inmates was dependent on the effective implementation of HIV counseling and testing programs at prison entry and after incarceration through clinical evaluations. The voluntary HIV testing system identified approximately 34 percent of all infected Maryland prison entrants when 1991 data from concurrent anonymous testing were evaluated (13). Sample surveys at prison entry suggest that many inmates refused HIV testing because of fear of a positive result or denial of HIV risk (13). These barriers to HIV detection are being addressed through a revised HIV education program that will be more peer-oriented, culturally-sensitive, and targeted toward those prison entrants at highest risk (that is, injection drug users).

During 1991 and 1992, approximately 50 percent of Maryland prison entrants were requesting HIV testing, requiring the allocation of resources for the counseling and testing of approximately 4,600 in-

mates annually. Although implementation of voluntary testing has significantly expanded the number of identified HIV-infected inmates, the growth of the HIV seropositive inmate population attributable to entry testing has not been associated with a parallel increase in inmates eligible for treatment since, as a group, prison entrants are diagnosed at an earlier stage of disease and have shorter sentences.

Through December 1992, HIV testing at prison entry has increased the number of diagnosed inmates by 88 percent, but has resulted in only a 60 percent increase in the number of infected inmates who are candidates for therapy. From a fiscal perspective, implementation of a voluntary HIV testing program in the Maryland State correctional system has not in and of itself required large adjustments to clinical staffing and treatment budgets.

Since many HIV seropositive inmates are not diagnosed at prison entry, this survey emphasizes the need for ongoing clinical evaluations and HIV testing for inmates during incarceration so that infected persons in need of critical medical interventions are readily identified. The differential in the percentage of persons eligible for therapy related to testing strategy does not in any way negate or even minimize the value of voluntary testing programs. These data do suggest that reliance upon data from voluntary testing alone will provide a biased perspective on the medical needs of a prison population. However, the value of voluntary testing at prison entry is not only to identify asymptomatic candidates for treatment but also to identify persons in the early stages of HIV infection who, although not immediately eligible for chemotherapy, can benefit from (a) behavioral interventions to limit the transmission of HIV infection, (b) counseling about medical treatments and prophylaxis to facilitate access to health care services, and (c) case management interventions to establish aftercare plans that provide primary care and support services upon release from prison.

Early public health and treatment interventions have a broader societal impact since Maryland inmates with HIV infection have a median sentence length of 72 months and would be expected to serve about only half of their sentence. Asymptomatic inmates (CD4 counts greater than 500 cells per mm³) and inmates diagnosed at prison entry had even shorter median sentence lengths of 60 months and 48 months, respectively. Since HIV-infected prison entrants tend to serve short sentences and to have high CD4 cells, many of these inmates would be released to the community prior to requiring anti-retroviral therapy, but still in need of primary medical care.

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Providing case management services to HIV-infected inmates prior to release is critical considering the formidable barriers faced by most released inmates in accessing health care, financial assistance, drug treatment, housing, and other support services. Studies evaluating zidovudine usage in Maryland indicate that minorities and injection drug users—populations overrepresented in prisons—are less likely to receive treatment and have an overall decreased survival, further emphasizing the crucial role of case management for HIV seropositive inmates returning to the community (14).

In Maryland, release planning has been implemented by DOC social work staff who develop aftercare plans with HIV infected inmates approximately 3 months prior to anticipated release. Accessing community resources has been facilitated by (a) proactively predicting release dates so that inmate needs can be assessed and workable aftercare plans developed, (b) networking with community agencies resulting in established interagency agreements and standardized referral practices, (c) collaborating with universities to enable HIV-infected inmates to participate in clinical trials before and after release, and (d) developing an intradepartmental agreement with the Maryland Department of Human Resources permitting application of entitlements prior to inmate release. With these efforts, the Maryland prison system has increasingly been viewed as part of the State HIV-service community, resulting in a continuum of health care delivery for inmates entering and leaving the correctional setting.

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